Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 - 53 (canceled).

54. (currently amended) A method of utilizing a microband electrode array sensor, said method comprising the steps of:

(a) providing said microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material on top of said substrate, said layer of insulating material having a first edge, wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide;

said first edge of said substrate and said first edge of said insulating material aligned to form a single edge;

a plurality of microband electrodes between said substrate and said layer of insulating material, a surface of each of said microband electrodes exposed at said single edge wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; and~~;~~

a plurality of gaps of selected lengths, one gap positioned between each of two adjacent microband electrodes; ~~and each of said gaps having a length great enough that no substantial overlap of diffusion layers occurs the signals produced by said microband electrodes; said method comprising the steps of:~~

(~~a~~ b) contacting said microband electrode array sensor with a sample suspected of containing an analyte; and

(~~b~~ c) performing anodic stripping voltammetry, wherein the lengths of said gaps are each larger than the sum of the lengths of diffusion layers surrounding adjacent microband electrodes formed upon establishing steady state conditions at the surface of each of said microband electrodes, and wherein said microband electrode array sensor generates a steady state signal equal to the sum of the signals produced by each of said microband electrodes when operated independent of said microband electrode array sensor.~~;~~

~~wherein said microband electrode array sensor wherein said insulating material is chosen from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.~~

55 - 68 (canceled).

69. (currently amended) A method of utilizing a microband electrode array sensor, said method comprising the steps of:

(a) providing said microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material; said microband electrodes having a surface exposed at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps of selected lengths, wherein there is one gap positioned between each of two adjacent microband electrodes and, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers; ~~and wherein the size of each gap is selected such that in operation, the signals produced by said microband electrodes in said array are additive~~; ~~which said method comprises the steps of:~~

(~~a~~ b) contacting said microband electrode array sensor with a sample suspected of containing an analyte; and

(~~b~~ c) applying a voltage to the microband electrodes of said microband electrode array sensor and scanning the voltage over a range such that said analyte should be oxidized or reduced at said microband electrodes, wherein the lengths of said gaps are each larger than the sum of the lengths of diffusion layers surrounding adjacent microband electrodes formed upon establishing steady state conditions at the surface of each of said microband electrodes, and wherein said microband electrode array sensor generates a steady state signal equal to the sum of the signals produced by each of said microband electrodes when operated independent of said microband electrode array sensor.

70. (previously presented) The method of claim 69 wherein the voltage is scanned from a negative voltage to a positive voltage.

71. (previously presented) The method of claim 69 wherein said insulating material of said sensor is selected from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

72. (previously presented) The method of claim 69 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.03 and 5 micrometers.

73. (previously presented) The method of claim 69 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.1 to about 0.2 micrometers.

74. (previously presented) The method of claim 69 wherein the exposed surface of each of said microband electrodes has a width between 1 to 25 micrometers.

75. (previously presented) The method of claim 69 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

76. (previously presented) The method of claim 75 wherein said adhesion layer comprises chromium.

77. (previously presented) The method of claim 69 wherein said substrate is planar.

78. (previously presented) The method of claim 69 wherein said sensor is integrated into a channel.

79. (previously presented) The method of claim 69 wherein the sample is contacted with a plurality of layers of microband electrode array sensors separated from each other by insulating material.

80. (currently amended) The method of claim 79 wherein in the multi-layer microband electrode array sensors each of said substrates is planar.

81. (currently amended) A method for performing electrochemical measurements on a sample suspected of containing an analyte, said method comprising the steps of:

~~contacting a sample suspected of containing an analyte with a microband electrode array sensor comprising:~~

(a) providing a microband electrode array sensor that is integrated into a channel, said microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material; said microband electrodes having a surface exposed at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps of selected lengths, wherein there is one gap positioned between each of two adjacent microband electrodes, and wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness

less than about 25 micrometers; ~~and wherein the size of each gap is selected such that in operation, the signals produced by said microband electrodes in said array are additive; and~~

(b) contacting said sample suspected of containing an analyte with said microband electrode array sensor, wherein the lengths of said gaps are each larger than the sum of the lengths of diffusion layers surrounding adjacent microband electrodes formed upon establishing steady state conditions at the surface of each of said microband electrodes, and wherein said microband electrode array sensor generates a steady state signal equal to the sum of the signals produced by each of said microband electrodes when operated independent of said microband electrode array sensor; and

(c) performing an electrochemical measurement. ~~wherein the sensor is integrated into a channel.~~

82. (previously presented) The method of claim 81 wherein the electrochemical measurement conducted with said sensor is selected from the group consisting of electrogravimetry; controlled-potential coulometry; controlled-current coulometry; voltammetry; anodic- and cathodic-stripping voltammetry; cyclic voltammetry; square wave voltammetry; differential pulse voltammetry; adsorptive stripping voltammetry; potentiometric stripping analysis and amperometry.

83. (previously presented) The method of claim 81 wherein the electrochemical measurement conducted with said sensor is cyclic voltammetry.

84. (currently amended) The method of claim 81 wherein the electrochemical

measurement conducted with said sensor is ~~cyclic~~ stripping voltammetry.

85. (previously presented) The method of claim 81 wherein said insulating material is selected from the group consisting of silicon carbide, silicon nitride, and silicon dioxide.

86. (previously presented) The method of claim 81 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.03 and 5 micrometers.

87. (previously presented) The method of claim 81 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.1 to about 0.2 micrometers.

88. (previously presented) The method of claim 81 wherein the exposed surface of each of said microband electrodes has a width of between 1 and 25 micrometers.

89. (previously presented) The method of claim 81 wherein said microband electrode array sensor further comprises an adhesion layer between said insulating layer and said microband electrodes.

90. (previously presented) The method of claim 89 wherein said adhesion layer comprises chromium.

91 - 95 (canceled).

96. (new) A method of determining the identity, concentration or both of analytes in a sample, said method comprising the steps of:

contacting a microband electrode array sensor to said sample, said microband electrode array sensor comprising:

a substrate having a first edge;

a layer of insulating material having a first edge aligned with said first edge of said substrate; and

a plurality of microband electrodes between said substrate and said layer of insulating material; said microband electrodes having a surface exposed to said sample at said first edges of said substrate and said insulating layer, said insulating material forming a plurality of gaps of selected lengths, wherein there is one gap positioned between each of two adjacent microband electrodes, wherein the exposed surface of each of said microband electrodes has a width less than about 25 micrometers and a thickness less than about 25 micrometers;

applying an electric potential to said microband electrode array sensor for a period of time long enough to achieve steady state conditions at the surface of each microband electrode, thereby generating a diffusion layer surrounding each of said microband electrodes;

selecting said lengths of said gaps such that the lengths of said gaps are each larger than the sum of the lengths of diffusion layers surrounding adjacent microband electrodes upon establishing steady state conditions at the surface of each of said microband electrodes, and

measuring a steady state current of said microband electrode array sensor, wherein said steady state current of said microband electrode array sensor is equal to the sum of the currents produced by each of said microband electrodes when operated independent of said microband electrode array sensor.

97. (new) The method of claim 96 where said electric potential applied to said microband electrode array sensor is scanned by increasing said electric potential.

98. (new) The method of claim 96 where said electric potential applied to said microband electrode array sensor is scanned by decreasing said electric potential.

99. (new) The method of claim 96 further comprising the step of scanning said electric potential from a negative voltage to a positive voltage.

100. (new) The method of claim 96 further comprising the step of scanning said electric potential from a positive voltage to a negative voltage.

101. (new) The method of claim 96 comprising a method of performing anodic stripping voltammetry, said method further comprising the steps of:

(a) applying a negative voltage for a sufficient time to allow for an analyte to be reduced onto said microband electrodes, thereby generating plated analyte; and

(b) scanning the voltage in a positive direction to oxidize said plated analyte off said microband electrodes.

102. (new) The method of claim 96 comprising a method of performing cathodic stripping voltammetry, said method further comprising the steps of:

(a) applying a positive voltage for a sufficient time to allow for an analyte to be oxidized onto said microband electrodes, thereby generating plated analyte; and

(b) scanning the voltage in a negative direction to reduce said plated analyte off said microband electrodes.

103. (new) The method of claim 96 wherein said microband electrode array sensor is integrated into a channel.

104. (new) The method of claim 103 wherein said channel is integrated into a flow-through analytical device.

105. (new) The method of claim 96 wherein each of said gaps have lengths greater than 50 micrometers.

106. (new) The method of claim 96 wherein the exposed surface of each of said microband electrodes has a thickness of between about 0.03 micrometers and 5 micrometers.

107. (new) The method of claim 96 wherein the exposed surface of each of said microband electrodes has a width of between about 1 micrometers and about 25 micrometers.

108. (new) The method of claim 96 comprising a method of performing an electrochemical measurement selected from the group consisting of

electrogravimetry; controlled-potential coulometry; controlled-current coulometry; voltammetry; anodic- and cathodic-stripping voltammetry; cyclic voltammetry; square wave voltammetry; differential pulse voltammetry; adsorptive stripping voltammetry; potentiometric stripping analysis and amperometry.